

# GROSS REPRODUCTION RATES FOR THE DÉPARTEMENTS OF FRANCE, 1891 to 1931

By D. V. GLASS

THE appended table of gross reproduction rates is given in the hope that it may be of interest to students of population questions. It will be recalled that a gross reproduction rate, which is discussed in detail in the works of R. R. Kuczynski, is calculated by summing the specific fertility rates obtaining in a given country and for a given period, multiplying the total by the ratio of female to all live births, and dividing the answer by a thousand. The result therefore shows the number of female children who would be born to each woman passing through the child-bearing period, assuming the maintenance of the fertility observed in the years chosen. Alternatively, it may be regarded as showing the number of female children who would be born to each female child born in the years chosen, assuming that none of these female children will die before passing through the reproductive ages, and holding constant the fertility observed in the years chosen. The net reproduction rate is obtained by combining with the fertility data mentioned the female stationary population derived from an appropriate life table. On the assumption that fertility and mortality remain constant, the net reproduction rate shows the number of girl children who will be born in the subsequent generation to each girl child born in the years chosen. In a similar way, generation gross and net reproduction rates could be calculated by using historical data on fertility and mortality.

Incidentally, Dr. Wilhelm Winkler, in a recent publication ("Einige Alte und Neue Masze des Natürlichen Bevölkerungswachstums," *Revue de l'Institut International de Statistique*, 1938, 1) suggests an illogicality in the net reproduction rate, which bases itself upon the stationary population in order to measure rates of inherent increase or decrease. At the same time Dr. Winkler

agrees that the system constructed by A. J. Lotka for calculating the true rate of natural increase (per year) is perfectly logical. But if this is the case, the net reproduction rate ( $R_n$ ) must also be perfectly logical, since it is bound to the true rate of natural increase ( $r$ ) by the relationship expressed by the formula  $r = \frac{1}{T} \cdot \log R_n$ , where  $T$  is the length

of the female generation in the *stable* population. It should, however, be remembered that in interpreting a net reproduction rate of, say, 0.7, the implied rate of decrease of 30 per cent. per generation refers to the *stable* generation, and not to the mean age of mothers in the stationary population. The stable generation is calculated by using Lotka's system of analysis.

As regards the rates given in the table, the normal method of computation by quinquennial age groups has been used for 1900-2 to 1930-2 inclusive, applying three-year averages of births to the relevant census populations. The requisite birth data, analysed by maternal age, were not available for the *Départements* in 1890-2, and the rates have been estimated by applying other specific fertility rates to the basic female populations. The margin of error involved in estimating these rates for the *Départements* is less than 6 per cent.\* Life tables for the relevant periods were constructed for calculating the net reproduction rates for the whole country.

\* In the August 1938 issue of *Population*, comparable rates for 1910-12 and 1930-2 are given in a paper by P. Depoid. There are some differences between the rates for 1910-12 given in the present paper and those given by Depoid. Mr. Depoid was kind enough to look into the reason for these differences and states (in a letter to the present writer) that his rates were calculated from data published in *Statistique de Mouvement de la Population* for 1928, and that, owing to a hitherto unnoticed printer's error, these data were defined as relating to the years 1910-12 whereas they were in fact based upon the years 1911-13.

TABLE  
GROSS REPRODUCTION RATES—FRANCE, 1891-1931

	1890-2	1900-1	1910-12	1920-2	1925-7	1930-2
1. Ain ... ..	I·393	I·440	I·255	I·329	I·188	I·123
2. Aisne ... ..	I·559	I·548	I·391	I·671	I·477	I·450
3. Allier ... ..	I·290	I·212	I·021	I·087	I·000	0·991
4. Alpes (Basses-)	I·741	I·693	I·338	I·354	I·218	I·125
5. Alpes (Hautes-)	I·982	I·907	I·655	I·567	I·440	I·301
6. Alpes Maritimes	I·223	I·167	0·990	0·904	0·856	0·736
7. Ardèche ... ..	I·913	I·802	I·471	I·401	I·253	I·168
8. Ardennes ... ..	I·454	I·438	I·357	I·481	I·368	I·381
9. Ariège ... ..	I·432	I·369	I·207	I·195	I·036	0·989
10. Aube ... ..	I·304	I·256	I·165	I·266	I·227	I·174
11. Aude ... ..	I·405	I·260	I·064	I·272	I·062	I·089
12. Aveyron ... ..	I·806	I·709	I·477	I·405	I·360	I·245
13. Belfort (Territoire de)	—	—	I·372	I·164	I·222	I·242
14. Bouches-du-Rhône	I·427	I·309	I·134	I·138	0·989	0·836
15. Calvados ... ..	I·306	I·318	I·348	I·533	I·383	I·401
16. Cantal ... ..	I·526	I·596	I·427	I·483	I·405	I·408
17. Charente ... ..	I·242	I·202	I·195	I·269	I·173	I·180
18. Charente-Inférieure	I·241	I·206	I·182	I·308	I·233	I·241
19. Cher ... ..	I·428	I·316	I·151	I·228	I·068	I·059
20. Corrèze ... ..	I·646	I·647	I·412	I·401	I·187	I·111
21. Corse ... ..	I·800	I·727	I·533	I·362	I·132	0·903
22. Côte-d'Or ... ..	I·194	I·224	I·086	I·262	I·205	I·198
23. Côtes-du-Nord ...	I·816	I·973	I·782	I·728	I·532	I·413
24. Creuse ... ..	I·390	I·333	I·158	I·123	I·074	I·015
25. Dordogne ... ..	I·403	I·395	I·304	I·364	I·223	I·186
26. Doubs ... ..	I·629	I·682	I·476	I·414	I·373	I·315
27. Drôme ... ..	I·439	I·337	I·161	I·202	I·058	I·007
28. Eure ... ..	I·335	I·415	I·363	I·474	I·396	I·383
29. Eure-et-Loir ...	I·460	I·480	I·411	I·467	I·378	I·384
30. Finistère ... ..	2·402	2·206	I·905	I·674	I·419	I·308
31. Gard ... ..	I·541	I·323	I·110	I·157	0·976	0·953
32. Garonne (Haute-)	I·035	I·063	0·990	I·071	0·991	0·975
33. Gers ... ..	0·939	I·017	0·949	I·146	I·140	I·077
34. Gironde ... ..	0·979	I·015	0·895	I·110	0·990	0·958
35. Hérault ... ..	I·317	I·252	I·069	I·222	0·941	0·921
36. Ille-et-Vilaine ...	I·633	I·508	I·389	I·434	I·318	I·314
37. Indre ... ..	I·442	I·372	I·185	I·240	I·135	I·143
38. Indre-et-Loire ...	I·175	I·154	I·122	I·227	I·151	I·184
39. Isère ... ..	I·369	I·248	I·085	I·147	I·103	I·012
40. Jura ... ..	I·490	I·549	I·342	I·400	I·281	I·238
41. Landes ... ..	I·449	I·449	I·258	I·219	I·098	I·051
42. Loir-et-Cher ... ..	I·444	I·333	I·286	I·350	I·222	I·235
43. Loire ... ..	I·414	I·384	I·119	I·139	I·039	I·013
44. Loire (Haute-) ...	I·576	I·616	I·309	I·301	I·178	I·147
45. Loire-Inférieure	I·447	I·374	I·160	I·243	I·166	I·162
46. Loiret ... ..	I·457	I·338	I·251	I·276	I·185	I·181
47. Lot ... ..	I·074	I·179	I·148	I·224	I·151	I·085
48. Lot-et-Garonne	0·958	I·004	0·967	I·166	I·078	I·096
49. Lozère ... ..	2·211	2·085	I·752	I·513	I·407	I·306
50. Maine-et-Loire	I·176	I·183	I·102	I·268	I·211	I·259
51. Manche ... ..	I·377	I·466	I·485	I·534	I·461	I·482
52. Marne ... ..	I·541	I·445	I·333	I·374	I·352	I·278
53. Marne (Haute-) ...	I·385	I·364	I·297	I·422	I·401	I·409
54. Mayenne ... ..	I·538	I·457	I·478	I·549	I·404	I·409
55. Meurthe-et-Moselle	I·509	I·555	I·552	I·431	I·448	I·375
56. Meuse ... ..	I·497	I·525	I·436	I·526	I·480	I·453
57. Morbihan ... ..	I·984	I·923	I·825	I·724	I·561	I·496

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TABLE—continued

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	1890-2	1900-1	1910-12	1920-2	1925-7	1930-2
58. Moselle ... ..	—	—	—	1·670	1·528	1·362
59. Nièvre ... ..	1·454	1·355	1·156	1·247	1·164	1·147
60. Nord ... ..	1·643	1·708	1·333	1·356	1·191	1·174
61. Oise ... ..	1·491	1·455	1·335	1·448	1·367	1·354
62. Orne ... ..	1·199	1·230	1·269	1·424	1·350	1·341
63. Pas-de-Calais ... ..	2·125	2·136	1·808	1·665	1·615	1·510
64. Puy-de-Dôme ... ..	1·185	1·223	1·073	1·130	1·029	0·983
65. Pyrénées (Basses-) ... ..	1·533	1·595	1·475	1·335	1·276	1·157
66. Pyrénées (Hautes-) ... ..	1·247	1·253	1·153	1·242	1·199	1·127
67. Pyrénées-Orientales ... ..	1·681	1·502	1·281	1·166	0·963	0·870
68. Rhin (Bas-) ... ..	—	—	—	1·445	1·257	1·151
69. Rhin (Haut-) ... ..	—	—	—	1·299	1·151	1·107
70. Rhône ... ..	1·059	1·037	0·847	0·897	0·919	0·915
71. Saône (Haute) ... ..	1·502	1·548	1·363	1·425	1·321	1·251
72. Saône-et-Loire ... ..	1·519	1·542	1·251	1·310	1·208	1·158
73. Sarthe ... ..	1·295	1·374	1·325	1·456	1·333	1·369
74. Savoie ... ..	1·672	1·652	1·462	1·435	1·341	1·279
75. Savoie (Haute-) ... ..	1·616	1·736	1·525	1·447	1·325	1·182
76. Seine (Paris et banlieue) ... ..	1·187	1·063	0·853	0·848	0·802	0·766
77. Seine-Inférieure ... ..	1·859	1·776	1·544	1·504	1·307	1·294
78. Seine-et-Marne ... ..	1·457	1·404	1·217	1·273	1·208	1·226
79. Seine-et-Oise ... ..	1·392	1·280	1·089	1·062	0·946	0·881
80. Sèvres (Deux-) ... ..	1·452	1·316	1·269	1·362	1·246	1·309
81. Somme ... ..	1·473	1·455	1·279	1·414	1·315	1·301
82. Tarn ... ..	1·242	1·354	1·152	1·237	1·123	1·065
83. Tarn-et-Garonne ... ..	1·117	1·123	1·069	1·278	1·135	1·142
84. Var ... ..	1·223	1·249	1·057	1·120	0·974	0·921
85. Vaucluse ... ..	1·188	1·312	1·159	1·214	1·029	1·034
86. Vendée ... ..	1·661	1·528	1·413	1·475	1·407	1·393
87. Vienne ... ..	1·395	1·307	1·262	1·308	1·220	1·238
88. Vienne (Haute-) ... ..	1·751	1·543	1·281	1·224	1·073	1·006
89. Vosges ... ..	1·655	1·664	1·479	1·392	1·263	1·235
90. Yonne ... ..	1·210	1·175	1·116	1·254	1·229	1·218†
Whole Country GRR : ...	1·451*	1·398†	1·221	1·249	1·147	1·100
„ „ NRR : ...	0·937	0·987†	0·924	0·982	0·930	0·927

\* Gross reproduction rates estimated.

† The gross and net reproduction rates for the whole country are for 1900-2. The births for 1902 were omitted from the *Département* calculations because it was not possible to correct a series of errors in the published vital statistics for 1902.

‡ The rates for the *Départements* are computed from the series of specific fertility rates for 1930-2 given in the *Statistique de Mouvement de la Population* for 1933, Part 1, p. lxxiii.